UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,120	11/28/2001	Kwong-Yu Chan	609920600024	1508

24325 7590 04/03/2007

PATENT GROUP 2N
JONES DAY
NORTH POINT
901 LAKESIDE AVENUE
CLEVELAND, OH 44114

EXAMINER	
WONG, EDNA	
ART UNIT	PAPER NUMBER
1753	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/996,120	CHAN ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,7-11,13 and 49-66* is/are pending in the application.

4a) Of the above claim(s) *56-61 and 63-66* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7-11,13,49-55 and 62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

This is in response to the Amendment dated March 1, 2007. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Claim Rejections - 35 USC § 112

Claims **1-2, 7-13 and 49-52** have been rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for *electrochemical oxidation*, does not reasonably provide enablement for *chemical oxidation*. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The rejection of claims 1-2, 7-13 and 49-52 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 102/103

Claims **1-2, 7-8, 11, 49 and 51-52** have been rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Richter et al.** (US Patent No. 4,126,934).

The rejection of claims 1-2, 7-8, 11, 49 and 51-52 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Richter et

al. has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

I. Claims **9, 12-13 and 50** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Richter et al.** (US Patent No. 4,126,934) as applied to claims 1-2, 7-8, 11, 49 and 51-52 above, and further in view of **Katsoulis et al.** (US Patent No. 3,668,014).

The rejection of claims 9, 12-13 and 50 under 35 U.S.C. 103(a) as being unpatentable over Richter et al. as applied to claims 1-2, 7-8, 11, 49 and 51-52 above, and further in view of Katsoulis et al. has been withdrawn in view of Applicants' amendment.

II. Claim **10** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Richter et al.** (US Patent No. 4,126,934) as applied to claims 1-2, 7-8, 11, 49 and 51-52 above, and further in view of **Katsoulis et al.** (US Patent No. 3,668,014) as applied to claims 9, 12-13 and 50 above, and further in view of **Ruetschi** (US Patent No. 3,160,526).

The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Richter et al. as applied to claims 1-2, 7-8, 11, 49 and 51-52 above, and further in view of Katsoulis et al. as applied to claims 9, 12-13 and 50 above, and further in view of Ruetschi has been withdrawn in view of Applicants' amendment.

Allowable Subject Matter

The indicated allowability of claim 12 is withdrawn in view of the newly discovered reference(s) to **WO 98/37997**. Rejections based on the newly cited reference(s) follow.

Response to Amendment

Election/Restrictions

Newly submitted claims **56-61 and 63-66** are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The species are independent or distinct because the electrodes and parts have a materially different design, mode of operation, function, and/or effect, e.g., a metal electrode is not the same as a non-metal electrode; and the electrode being a part of a fuel cell would not have functioned as a glucose sensor. Thus, the electrodes are not obvious variants.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 56-61 and 63-66 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

I. Claims **1-2, 7-8, 11, 49, 51-55 and 62** are rejected under 35 U.S.C. 103(a) as

being unpatentable over **Richter et al.** (US Patent No. 4,126,934) in combination with **WO 98/37997** ('997).

Richter teaches a method comprising:

passing a solution containing organic molecules (= a phosphate buffer solution with 0.1 m glucose) over a catalyst (= an alloy) to electrochemically catalyze (= a current density of about 0.5 mA/cm^2) the oxidation of the organic molecules, said catalyst comprising a mixture of platinum and cobalt (= an alloy with a composition corresponding to an atom ratio Pt:Co of 1:4) [col. 7, Example 4].

The catalyst **11** (= a catalytically active layer) is supported on an electrode **12** (= one side of a support structure of a Pt-Ni alloy) [col. 6, lines 3-6 and lines 49-53; and Fig. 1].

The platinum is present in an amount within the range of about 52 to about 99 weight percent of the catalyst (= the inactive component is not dissolved out completely and the active catalytic layer may still contain small quantities of the inactive component besides the active component) [col. 4, lines 13-18; and col. 7, Example 4: "chemically activated"].

The cobalt is present in an amount within the range of about 48 to about 1 weight percent of the catalyst (= the inactive component is not dissolved out completely and the active catalytic layer may still contain small quantities of the inactive component besides the active component) [col. 4, lines 13-18; and col. 7, Example 4: "chemically activated"].

The cobalt is present in an oxidation state of 0, 2, 8/3 or 3 (= cobalt) [col. 7, Example 4].

The platinum and the cobalt are mutually discrete (= in order to obtain a *fine-grain* alloy, which is easier to roll, the melt is chilled) [col. 6, lines 21-22].

The organic molecules are glucose molecules (col. 7, Example 4).

The oxidation of the organic molecules uses the organic molecules as fuel for a fuel cell (= a biofuel cell) [col. 1, lines 64-66].

The catalyst is part of an electrode (= the electrode furnished) [col. 7, Example 4].

The electrode functions as an anode in the passing (= electrodes made by the method are suited to particular advantage for use as anodes in bio-fuel cells (col. 2, lines 41-44).

The method of Richter differs from the instant invention because Richter does not disclose the following:

a. Wherein the catalyst further comprises tin, as recited in claim 1.

WO '997 teaches porous metals for gas sensors; chemical sensors; *biosensors, for example for glucose or therapeutic drugs*; batteries; *fuel cells, for example as anode and cathode electrodes or solid electrolyte*; solar cells; electrochromatic devices; field emitter; electrocatalysis; magnetic devices; optical devices; scientific applications; and for use as *catalysts, electrode materials*, fluid storage media and sorbents (page 9, line

16 to page 10, line 2). Suitable metals include for example the first, second and third row transition metals, in particular, *platinum*, palladium, gold, silver, nickel, *cobalt*, copper, iron, lead, *tin* and indium. The metals may contain surface layers of, for example, oxides, sulphides or phosphides (page 3, lines 7-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by Richter with wherein the catalyst further comprises tin because a Pt/Co/Sn catalyst would have been functionally equivalent as a catalyst and/or electrode material for glucose biosensors and/or fuel cells as taught by WO '997 (page 3, lines 7-14).

Furthermore, it has been held that the selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination. See MPEP § 2144.06 and § 2144.07.

b. Wherein the oxidation converts the organic molecules to gluconic acid, as recited in claim 53.

Richter teaches that the electrode furnished a current density of about 0.5 mA/cm^2 in a phosphate buffer solution with 0.1 m *glucose*, at room temperature (col. 7, Example 4).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the electrochemical oxidation of the glucose would have been:

$$\text{glucose} + O_2 + H_2O \xrightarrow{\text{catalyst}} \text{gluconic acid} + H_2O_2.$$

c. Wherein the tin is not greater than about 10 atom percent of the catalyst, as recited in claim 54.

WO '997 teaches that the porous metals prepared may be expressed by the empirical formula: M_xA_h, wherein M is a metallic element, x is the number of moles or mole fraction of M, A is oxygen, sulphur or hydroxyl, or a combination thereof, and h is the number of moles or mole fraction of A. Preferably, x is greater than h, particularly preferably the ratio h/x is in the range 0 to 0.4, most preferably in the range 0 to 0.1 (page 8, lines 14-24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the percentage of tin described by WO '997 with wherein the tin is not greater than about 10 atom percent of the catalyst because the percentage of tin is a result-effective variable and one skilled in the art has the skill to calculate the percentage of tin would have determined the success of the desired reaction to occur, e.g., the usage of the catalyst in a biosensor vs. in a fuel cell (MPEP § 2141.03 and § 2144.05(II)(B)).

II. Claims **9, 13 and 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Richter et al.** (US Patent No. 4,126,934) in combination with **WO 98/37997** ('997)

as applied to claims 1-2, 7-8, 11, 49, 51-55 and 62 above, and further in view of **Katsoulis et al.** (US Patent No. 3,668,014).

Richter and WO '997 are as applied above and incorporated herein.

The method of Richter differs from the instant invention because Richter does not disclose the following:

a. Wherein said catalyst comprises metal oxides of said cobalt, as recited in claim 9.

Richter teaches platinum and cobalt (col. 7, Example 4).

Katsoulis teaches that the electrocatalyst can be of any of the various materials, including *pure elements*, alloys, mixtures and *oxides* which will enhance an electrochemical reaction (col. 3, lines 1-15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by Richter with wherein said catalyst comprises metal oxides of said cobalt because an electrocatalyst of any of the various materials, including *pure elements*, alloys, mixtures and *oxides* would have enhanced an electrochemical reaction as taught by Katsoulis (col. 3, lines 1-15).

b. Wherein said catalyst further comprises a mixture of carbon and polytetrafluoroethylene, as recited in claim 13.

c. Wherein the platinum and the cobalt are in the form of platinum particles and cobalt particles, as recited in claim 50.

Richter teaches that a Pt:Co foil was prepared (col. 7, Example 4).

Katsoulis teaches that a catalytic mass, particularly combined with an electrically-conducting element, and/or a continuous hydrophobic polymer membrane is suitable for use as an electrode in an electrochemical cell, e.g., as a fuel or oxidant electrode in a fuel cell or as the cathode in a metal-air battery, wherein it provides high current densities at relatively constant voltages over a long period of time (col. 1, lines 12-22). The catalytic mass includes cobalt-platinum alloys (col. 3, lines 1-15). The continuous hydrophobic polymer membrane includes polytetrafluoroethylene (PTFE) [col. 2, lines 46-72).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by Richter with wherein said catalyst further comprises a mixture of carbon and polytetrafluoroethylene; and wherein the platinum and the cobalt are in the form of platinum particles and cobalt particles because a catalytic mass, particularly combined with an electrically-conducting element, and/or a continuous hydrophobic polymer membrane would have been suitable for use as an electrode in an electrochemical cell, e.g., as a fuel or oxidant electrode in a fuel cell wherein it would have provided high current densities at relatively constant voltages over a long period of time as taught by Katsoulis (col. 1, lines 12-22).

Furthermore, substituting the foil electrode disclosed by Richter with the matrix electrode disclosed by Katsoulis would have been functionally equivalent as the fuel or oxidant electrode in a fuel cell.

III. Claim **10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Richter et al.** (US Patent No. 4,126,934) in combination with **WO 98/37997** ('997) as applied to claims 1-2, 7-8, 11, 49, 51-55 and 62 above, and further in view of **Katsoulis et al.** (US Patent No. 3,668,014) as applied to claims 9, 13 and 50 above, and further in view of **Ruetschi** (US Patent No. 3,160,526).

Richter, WO '997 and Katsoulis are as applied above and incorporated herein.

The method of Richter differs from the instant invention because Richter does not disclose wherein said metal oxides are the products of reactive electrodeposition, as recited in claim 10.

Ruetschi teaches that it is known in the art that cobalt metal can be oxidized anodically in alkaline electrolyte to cobalt oxides (col. 1, lines 20-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metal oxides described by Katsolulis with wherein said metal oxides are the products of reactive electrodeposition because it is known in the art that cobalt metal can be oxidized anodically in alkaline electrolyte to cobalt oxides as taught by Ruetschi (col. 1, lines 20-21).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong
Primary Examiner
Art Unit 1753

EW
March 30, 2007